Claims

1. System for controlling the telescopic movements of the telescopic beams in the spreader (1) and the locking movements of the twistlocks in the telescopic beams, the spreader including two telescopic beams (3) moving inside the spreader frame (2), **characterised** in that

- for stopping the telescopic movement of the telescopic beams (3) at a desired place in relation to the frame, the telescopic beams (3) and the frame (2) of the spreader in the system have locking members (8);

- the system comprises a joint multi-rope lever system (4) for performing the telescopic movement of the telescopic beams (3) and the locking movements of the twistlocks (6);

- the system includes at least one actuator (7) operating the multi-rope lever system;

- the system includes a control system (9) for supervising and controlling the operations of the actuator and the lever system.

2. Control system according to claim 1, **characterised** in that rope forces of different sizes have to be generated to the multi-rope lever system for performing the telescopic movements of the telescopic beams (3) and the different locking movements (4) of the twistlocks (6).

3. Control system according to claim 2, **characterised** in that a first rope force has to be generated to the lever system, as the telescopic beams (3) perform the telescopic movement; a second rope force, as the locking points (81) of the telescopic beams (3) move to the place of the locking units (82) of the frame (2); and a third rope, as the twistlocks (6) of the telescopic beams perform the locking movements; and that the first, second and third rope force differ clearly from each other.

4. Control system according to one of the claims 1 – 3, **characterised** in that the locking members (8) include the locking point (81), comprising a drive ramp (812) and a form-locking groove (811), and that the locking parts (82) include a locking roller (822) fitting into the form-locking groove and a locking spring (823) locking the locking roller, the compression force of the spring being adjustable, for example, with a magnet (821).

5. Control system according to one of the claims 1 – 4, **characterised** in that the multi-rope lever system (4) is common to both the telescopic beams (3; 3a, 3b) of the spreader, and that different rope forces may be generated to the multi-rope lever system with one actuator (7).

6. Control system according to claim 5, **characterised** in that the external force directed to the telescopic beams (3) is partly neutralised by the elasticity of the multi-rope lever system (4) and partly by the interaction between the locking point (81) of the telescopic beams and the locking unit (82) of the frame.

7. Control system according to one of the claims 1 – 6, **characterised** in that the telescopic beams (3) operate as counter weights for each other with the help of the multi-rope lever system (4) and the support rollers (51), as the first telescopic beam is at a different height from the second telescopic beam.

8. Method for controlling the telescopic movements of the telescopic beams (3) in the spreader (1) and the locking movements of the twistlocks (6) in the telescopic beams by a joint multi-rope lever system (4), **characterised** in that

- as one wishes to move the telescopic beams (3) telescopically outwards or inwards in relation to the frame (2) of the spreader, the first locking member (8) between both the telescopic beams of the spreader and the frame is opened, the locking member including the locking unit (82) of the frame and the first locking point (81) of the telescopic beam; and the first rope force is generated to the multi-rope lever system (4) of the telescopic beams in the spreader for moving the telescopic beams in relation to the frame of the spreader;

- as the second locking points (81) in the telescopic beams (3) arrive at the place of the locking unit (82) of the spreader frame, the second rope force is generated to the multi-rope lever system (4), which force differs from the first rope force, and with which second force the second locking points (81) of the telescopic beams may be transferred to the locking unit (82) of the frame;

- as the second locking member with the second locking point (81) of the telescopic beam and the locking unit (82) of the spreader frame has been locked, the third rope force is generated to the multi-rope lever system for closing and/or opening the twistlocks (6), the third rope force being different from the first and the second rope force.

9. Method according to claim 8, **characterised** in that the operation of the multi-rope lever system (4) is controlled with the help of the control logic of the control system (9) and the frequency converter, and that the deviations in rope forces are calculated and reported on the basis of the detected rope forces in the lever system and the target values for the rope forces.

10. Method according to one of the claims 8 – 9, **characterised** in that as an external impact in the direction of the longitudinal axis of the telescopic beams hits the telescopic beams (3), causing the telescopic beams to move from the first telescopic beam position in relation to the frame into the second telescopic beam position in relation to the frame, the elastic strain accumulated to the lever system (4) returns the telescopic beams to their initial position together with the locking member (8).